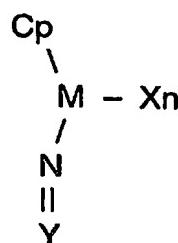


CLAIMS.

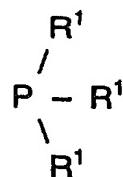
1. Process for the preparation of a polymer comprising monomeric units of ethylene, an  $\alpha$ -olefin and a vinyl norbornene applying as a catalyst system:
- a bridged or an unbridged group 4 metal containing an unbridged catalyst
- 5 having a single cyclopentadienyl ligand and a mono substituted nitrogen ligand, wherein said catalyst is defined by the formula I:
- an aluminoxane activating compound,
  - c. 0 - 0.20 mol per mol of the catalyst of a further activating compound,



Form. I.

wherein Y is selected from the group consisting of:

ai) a phosphorus substituent defined by the formula:



Form. II.

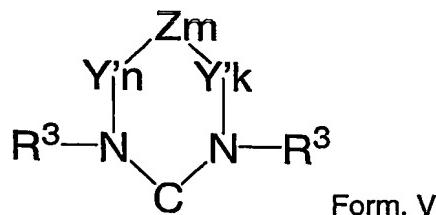
15 wherein each R<sup>1</sup> is independently selected from the group consisting of a hydrogen atom, a halogen atom, C<sub>1-20</sub> hydrocarbyl radicals which are unsubstituted by or further substituted by a halogen atom, a C<sub>1-8</sub> alkoxy radical, a C<sub>6-10</sub> aryl or aryloxy radical, an amido radical, a silyl radical of the formula:



wherein each R<sup>2</sup> is independently selected from the group consisting of hydrogen, a C<sub>1-8</sub> alkyl or alkoxy radical, C<sub>6-10</sub> aryl or aryloxy radicals, and a germanyl radical of the formula:



25 wherein R<sup>2</sup> is independently selected from the group consisting of hydrogen, a C<sub>1-8</sub> alkyl or alkoxy radical, C<sub>6-10</sub> aryl or aryloxy radicals, ai) a substituent defined by the formula:



wherein each of Y is C R<sup>3</sup> R<sup>3</sup>, C=C R<sup>3</sup> R<sup>3</sup>, C=N R<sup>3</sup>, SiRR, C=O, N R<sup>3</sup>, P R<sup>3</sup>, O or S,

Z is - A=A, and each A is C R<sup>3</sup>, N or P,

each R<sup>3</sup> is independently selected from the group of hydrogen, hydrocarbyl radical, silyl radical according to form. III or germanyl radical according to form. IV,

k, m and n have independently the value 0, 1, 2 or 3, provided that k + m + n > 0 and

10 aiii) a substituent defined by the formula:

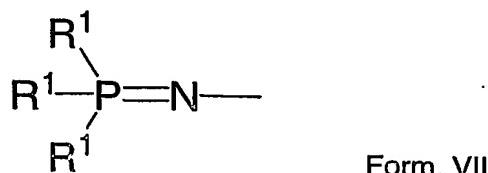


wherein each of Sub<sup>1</sup> and Sub<sup>2</sup> is independently selected from the group consisting of hydrocarbyls having from 1 to 20 carbon atoms, silyl groups, amido groups and phosphido groups.

15 Cp is a ligand selected from the group consisting of cyclopentadienyl, substituted cyclopentadienyl, indenyl, substituted indenyl, fluorenyl and substituted fluorenyl; X is an activatable ligand and n is 1 or 2, depending upon the valence of M and the valence of X; and

20 M is a group 4 metal selected from the group consisting of titanium, hafnium and zirconium.

2. Process according to of claim 1, wherein the catalyst used contains a phosphinimine ligand which is covalently bonded to the metal, defined by the formula:



25 wherein each R<sup>1</sup> is independently selected from the group consisting of a

hydrogen atom, a halogen atom, C<sub>1-20</sub> hydrocarbyl radicals which are unsubstituted by or further substituted by a halogen atom, a C<sub>1-8</sub> alkoxy radical, a C<sub>6-10</sub> aryl or aryloxy radical, an amido radical, a silyl radical of the formula III and a germanyl radical of the formula IV.

- 5      3. Process according to claim 2, wherein the catalyst comprises as phosphinimine ligand tri-(tertiary butyl) phosphinimine.
4. Process according to any one of claims 1-3, wherein the alumoxane used is of the formula: (R<sup>4</sup>)<sub>2</sub>AlO(R<sup>4</sup>AlO)<sub>m</sub>Al(R<sup>4</sup>)<sub>2</sub> wherein each R<sup>4</sup> is independently selected from the group consisting of C<sub>1-20</sub> hydrocarbyl radicals and m is from 0 to 50.
- 10     5. Polymer obtainable by the process of any one of claims 1-4.
6. Polymer according to claim 5, wherein  
[VNB] > 0.01 and  
 $\Delta\delta > 30 - 15 * [VNB]$ , provided that  $\Delta\delta$  is not negative,  
[VNB] is the content of vinyl norbornene in the polymer in weight % and  
15      $\Delta\delta$  is, expressed in degrees, the difference between the phase angle  $\delta$  at an angular frequency of 0.1 rad/s and the phase angle  $\delta$  at an angular frequency of 100 rad/s, as measured by dynamic mechanical spectroscopy, at a temperature of 125°C.
7. Polymer according to claim 6, wherein  $\Delta\delta > 35 - 15 * [VNB]$ .
- 20     8. Polymer according to any one of claims 5-7, wherein the content of vinyl norbornene is between 0.1 and 4 weight %.
9. Polymer according to any one of claims 5-8, wherein the polymer comprises at least 0.01 weight % 5-ethylene-2-norbornene.
- 25     10. Polymer according to any one of claims 5-9, wherein  $\Delta\delta > 25 - 12,5 * (Q-2)$ , whereby Q = Mw/Mn, Mw is the weight average molecular weight and Mn is the number average molecular weight.